REMARKS

Claims 1-11 are currently pending in the application. Claims 1, 3, 8, and 10 are in independent form. In light of the Examiner's comments, claims 1 and 10 have been amended to more precisely claim the unique aspects of the present invention.

Claims 1-11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,995,866 to Lemelson. Specifically, the Office Action holds that Lemelson discloses a fuzzy inference system and method of modulating radiation treatment, including an imaging device for creating and storing image data of relevant tissue and organ parts, input means for inputting imaging data, inference means operatively connected to the input means for analyzing the imaging data and determining a radiation treatment target from a non-treatment target and determining strength of radiation treatment, output means for modulating radiation treatment pursuant to the analysis from the inference means, and modulating radiation treatment pursuant to data obtained from the fuzzy inference system. Reconsideration of the rejection under 35 U.S.C. § 102(b), as anticipated by Lemelson, as applied to the claims, is respectfully requested. Anticipation has always been held to require absolute identity in structure between the claimed structure and a structure disclosed in a single reference.

In Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 U.S.P.Q. 81 (Fed. Cir. 1986) it was stated: "For prior art to anticipate under §102 it has to meet every element of the claimed invention."

In Richardson v. Suzuki Motor Co., Ltd., 868 F.2d 1226, 9 U.S.P.Q.2d 1913 (Fed. Cir. 1989) it was stated: "Every element of the claimed invention must be literally present, arranged as in the claim."

Independent claims 1 and 10 have been amended to further clarify the invention. The single input fuzzifier inputs and optimizes singular imaging data

and a physician's treatment intention including dose/volume constraints for critical organs, normal tissues, targets and compromising strategy between critical organs, normal tissues, and targets. Support for this amendment can be found in the following paragraphs:

[0037] The artificial intelligence (AI) method, fuzzy logic, is applied to optimize parameters in the inverse treatment planning for intensity-modulated radiation therapy (IMRT). With the capability of fuzzy inference, the parameter modification of the objective function is guided by physician's treatment intention and experience. For the different parameters involving inverse planning, the corresponding fuzzy inference systems (FISs) are developed in order to accomplish the treatment requirement. With the function of fuzzy inference, the efficiency and quality of inverse planning can be substantially improved.

[0125] As the configuration of FIS is flexible, it provides a wide space to customize the configuration for different applications. In the system, the input characteristic doses are chosen as the mean dose combined with its standard deviation. For target, the lower than mean input dose helps the FIS to drive the target dose to be higher toward the prescribed one in the next iteration. Similarly, for critical organ and normal tissue, the higher than mean input dose drives critical and normal tissue doses to be lower toward the prescribed ones in the next iteration. In this way, both high target dose and lower critical organ (and normal tissue) doses can be easier to achieve. For output variables, they are simply defined as the relative adjustment of the weighting factors, which are between -1 and 1. For the selection of inference rules, it is primarily determined by the clinical experience. The general treatment intention can be described as: If the target dose is low, its weighting factor should be increased. If the critical organ and normal tissue doses are high, their weighting factors should be increased. In the system of the present invention, such treatment intention is expressed by eight rules, which is a complete combination of linguistic tags for three kinds of involved organs. The option can avoid any unpredicted input values. As for the selection of

membership functions, the Gaussian function is adopted due to its simplicity and popularity for most of the engineering applications. In some circumstances, part of the Gaussian function is used, such as those shown in FIG. 2a-2c.

In other words, the goal of the present invention is to optimize a treatment plan of radiation therapy for a patient, i.e. the present invention deals with therapeutic issues. Therefore, various parameters are entered into the fuzzy logic system that are related to optimize a treatment plan. While these parameters when adjusted can cause changes in radiation beams, these changes are uncertain and indirect. These parameters include, among other things, various imaging data taken from the patient, and a physician's treatment intention including dose/volume constraints for critical organs, normal tissues, targets and compromising strategy between critical organs, normal tissues, and targets.

In contradistinction, Lemelson discloses a method of modulating a radiation beam directly and scans patients to identify possible cancerous objects or tissues. In other words, Lemelson describes an imaging system wherein parameters are entered into the fuzzy logic system for adjusting the code signal to control characteristics of the radiation beam that is applied to the patient, not a treatment system. There are no parameters entered in Lemelson that represent singular imaging data and a physician's treatment intention including dose/volume constraints for critical organs, normal tissues, targets and compromising strategy between critical organs, normal tissues, and targets as are required in the presently pending claims. This is because Lemelson's method is not a treatment method, but a diagnostic method.

Therefore, since Lemelson does not disclose single input fuzzifier means for inputting and optimizing singular imaging data and a physician's treatment intention including dose/volume constraints for critical organs, normal tissues, targets and compromising strategy between critical organs, normal tissues, and targets as set forth in the presently pending independent claims, the claims

are patentable over Lemelson and reconsideration of the rejection is respectfully requested.

The remaining dependent claims not specifically discussed herein are ultimately dependant on the independent claims. References as applied against these dependent claims do not make up for the deficiencies of those references as discussed above, and the prior art references do not disclose the characterizing features of the independent claims as discusses above. Hence, it is respectfully submitted that, in light of the present amendment, all of the pending claims are patentable over the prior art.

In conclusion, it is respectfully submitted that, in light of the present amendment, the presently pending claims are in condition for allowance, which allowance is respectfully requested. Applicant respectfully requests to be contacted by telephone at (248)539-5050 if any remaining issues exist.

The Commissioner is authorized to charge any fee or credit any overpayment in connection with this communication to our Deposit Account No. 11-1449.

Respectfully submitted,

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I hereby certify that this correspondence is being electronically filed with the United States Patent & Trademark Office on the above date.

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